**Reviewer's report**

**Title:** Evaluation of an automated ultraviolet radiation device for decontamination of Clostridium difficile and other healthcare-associated pathogens in hospital rooms

**Version:** 1  **Date:** 21 April 2010

**Reviewer:** Anthony Dolan

**Reviewer's report:**

Overview;

The manuscript describes the use of a device that utilizes ultraviolet-C radiation to destroy pathogens. To assess this the authors have artificially inoculated surfaces with bacteria, subjected it to UV using the instrument and after that it is unclear from the methods if they recovered surviving bacteria and by what method this was done. This was done on a small scale, experiments being repeated twice. The device was also used on hospital rooms. The methods lack detail in some key areas and the manuscript would benefit from revision.

- **Major Compulsory Revisions**

Lines 92 to 105: This section needs major revision and additional detail to clearly establish what was done. Were swabs used to examine the level of artificial contamination applied to the bench top and this amount was then adjusted to log 3 – log 5 cells before dosing with UV? If the inoculum was adjust to log 3 – 5 before inoculation, how was this achieved? Over what surface area was the inoculum applied? How can direct plating onto agar plates from a swab be used to assess if there are 10,000 cells inoculated onto a surface? Over the time course between swabbing and determining how many bacteria have been inoculated onto a surface, will the amount of culturable bacteria be naturally reduced or not?

- **Minor Essential Revisions**

Line 30, 31: Suggest that “logs” be revised to log10 2-3 CFU cm-2 or m-3 or scientific notation as appropriate. Recommend this be used throughout the manuscript and any figures so that continuity is maintained

Line 34: change to: “After routine cleaning of the rooms of MRSA carriers, ……”

Line 91: Eradication of pathogens inoculated onto surfaces – there was a reduction in the amount of organisms not a complete eradication from what I can see. Revise here and throughout

Line 97: Pre-moistened swabs – pre-moistened with what and what kind of swabs (manufacturer??)
Line 98: “For each pathogen, the inoculum applied….” Should be moved to earlier in the paragraph

Line 99: use either log 3 – log 5 CFU or 10^3 to 10^5 throughout the manuscript for continuity

Lines 111-113: Where the phrase “cultured” is used, the reader should be referred to the section that explains how this was done i.e. as described above OR as described below etc.

Line 121: Staphylococcus warneri was also inoculated… - please indicate over what size surface area and the concentration of the inoculum that was used. Also in line 125 if not the same. How was this prepared and what media was then used to culture the organism, this is not indicated in the manuscript.

Lines 150 – 162: Figure 1 shows the average log reduction of various organisms after exposure. However it would possibly be better to know exactly how much was inoculated in each instance. For example if there was log10 3 CFU cm-2 inoculated and this was reduced by log10 2.5 CFU cm-2 the effect is obviously greater than if there was log10 5 CFU cm-2 inoculated and log10 2.5 CFU cm-2 remains on the surface. If possible, substituting Fig. 1 for a detailed table of inoculation levels and then the amount recovered after exposure would give the reader a better indication of the effectiveness of the device. Suggest a revision of this section.

Figure 2 adds little to the overall manuscript, suggest removal. Likewise figure 5.

Lines 186-187. Difficult to gauge the effect of disinfection as the level of S. warneri inoculation is not stated in the methods.

Line 217; I disagree with the authors; if the cycle requires only 45 minutes, this would be considered a rapid turnaround time in comparison with a method such as VHP.

Line 251: Please disclose if the system was provided at cost or free for the purpose of the study.

Line 289: Reference should read: “Spores of Bacillus subtilis: their resistance to and killing by radiation, heat and chemicals”

Discretionary Revisions

Introduction:

Can the authors indicate if the device needs to be moved or aimed manually at a surface or is this completely automated with the entire room receiving an adequate dose of UV without any manual interference? What about shaded areas?

Line 27: not sure commonly-touched needs hyphenation
Line 79: suggest change to “… CDI in Cleveland were used in this study.”

**Level of interest:** An article whose findings are important to those with closely related research interests

**Quality of written English:** Acceptable

**Statistical review:** No, the manuscript does not need to be seen by a statistician.

**Declaration of competing interests:**

I declare that I have no competing interests